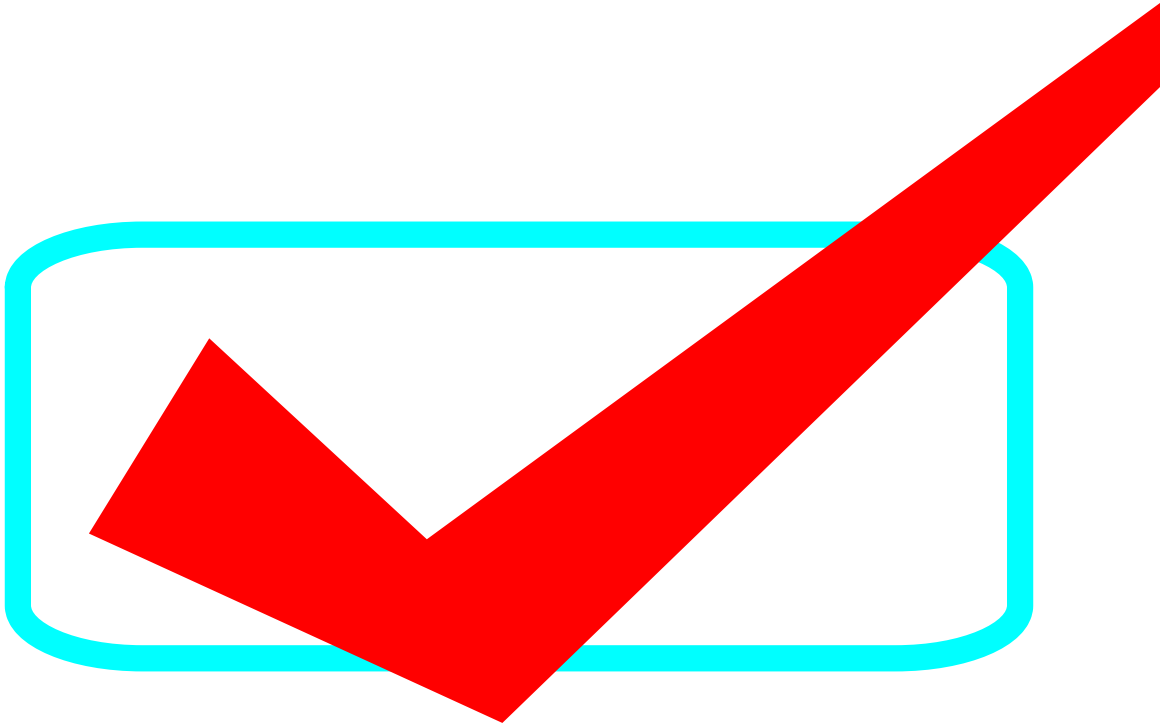


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# PERFORMANCE STANDARDS

Version 2.0



Middle School

Mathematics

**DUVAL COUNTY SCHOOLS**

**JACKSONVILLE, FLORIDA**

**Middle School Mathematics**  
**Performance Standards**  
**Version 2.0**

**1.0 Number Theory**

The student will:

- 1.1 Understand the relationships among factors, multiples, divisors, and products.
- 1.2 Link area and dimensions of rectangles with products and factors.
- 1.3 Identify numbers as prime or composites and as odd or even based on their factors.
- 1.4 Develop strategies for finding factors and multiples of whole numbers.
- 1.5 Demonstrate the Fundamental Theorem of Arithmetic with specified whole numbers.
- 1.6 Develop strategies to solve problems involving factors and multiples.
- 1.7 Describe and continue given number patterns.

**2.0 Working With Data**

The student will:

- 2.1 Explore the process of data investigation, such as posing questions, collecting data, analyzing data, and making interpretations to answer questions.
- 2.2 Represent data using line graphs, bar graphs, stem-and-leaf plots, and coordinate graphs.
- 2.3 Explore ways of describing data such as measures of center (mode, median, mean) and range or variability in the data.
- 2.4 Develop strategies for comparing data sets.

**3.0 Geometry**

The student will:

- 3.1 Recognize, classify and analyze polygons.
- 3.2 Explore side-angle-shape connections of triangles, squares, rectangles, and parallelograms.
- 3.3 Estimate the size of angle using reference to a right angle and other benchmark angles.
- 3.4 Develop strategies for solving problems involving polygons and their properties.

## **4.0 Understanding Rational Numbers**

The student will:

- 4.1 Model situations involving fractions, decimals, and percents.
- 4.2 Develop an understanding of the relationships between fractions, decimals, and percents.
- 4.3 Compare and order fractions.
- 4.4 Use equivalent fractions to reason about situations.
- 4.5 Use benchmarks that relate different forms of representations for rational numbers. (50% is the same as  $\frac{1}{2}$  and 0.5)
- 4.6 Move flexibly between fraction, decimal, and percent representations.

## **5.0 Measurement**

The student will:

- 5.1 Find areas and perimeters of rectangular shapes and non-rectangular shapes.
- 5.2 Develop procedures for finding areas and perimeters of rectangles.
- 5.3 Use area and perimeter to solve applied problems.
- 5.4 Find perimeters and areas of non-rectangular figures by ‘covering’ the figures with grids, tiles, or other objects and ‘surrounding’ the figure with string, straight-line segments, or other objects.
- 5.5 Reason about spatial relationships.
- 5.6 Use models and representations of models to solve problems.

## **6.0 Working with Rational Numbers**

The student will:

- 6.1 Estimate sums and differences of fractions and decimals.
- 6.2 Add and subtract fractions.
- 6.3 Use area to model multiplication of fractions.
- 6.4 Add, subtract, multiply, and divide with decimals.

## **7.0 Probability**

The student will:

- 7.1 Complete simple probability experiments.

- 7.2 Describe the relationship between experimental and theoretical probabilities.
- 7.3 Interpret statements of probability.
- 7.4 Develop strategies for finding experimental and theoretical probabilities
- 7.5 Use data displayed in graphs and tallies to find experimental probabilities.
- 7.6 Organize data into lists or charts as a strategy for finding theoretical probabilities.

## **8.0 Spatial Sense**

The student will:

- 8.1 Create two-dimensional representations of three-dimensional cube structures.
- 8.2 Communicate spatial information.
- 8.3 Understand and recognize line symmetry.
- 8.4 Make isometric drawings of cube structures.
- 8.5 Reason about spatial relationships.
- 8.6 Use models and representations of models to solve problems.

## **9.0 Patterns and Functions**

The student will:

- 9.1 Sketch coordinate graphs to show relationship between two variables.
- 9.2 Describe regular or predictable change in data from given patterns.
- 9.3 Select the appropriate range of values for given variables.
- 9.4 Create tables, graphs, and simple symbolic rules that describe the patterns of change.
- 9.5 Describe relationships among forms of data representation – words, tables, graphs, and symbolic rules.
- 9.6 Make decisions using tables, graphs, and rules.

## **10.0 Similarity**

The student will:

- 10.1 Identify similar figures visually and by comparing sides and angles.
- 10.2 Recognize that lengths between similar figures change by a constant scale factor.
- 10.3 Build larger or smaller similar shapes from copies of a basic shape.

- 10.4 Divide a shape into smaller, similar shapes.
- 10.5 Describe the relationship between similarity and equivalent fractions.
- 10.6 Describe the effect of scale factor on length ratios and area ratios.
- 10.7 Determine and use scale factors to find unknown lengths.
- 10.8 Use the concept of similarity to solve real-world problems.
- 10.9 Use geometry software to explore similarity and transformations.
- 10.10 Make connections between algebra and geometry.

## **11.0 Ratio, Proportion, and Percent**

The student will:

- 11.1 Demonstrate the use of the term ‘ratio’, ‘proportion’, and ‘percent’ to ask comparison questions.
- 11.2 Find equivalent ratios.
- 11.3 Represent data in tables and graphs.
- 11.4 Set up and solve proportions that arise in applications.
- 11.5 Look for patterns in tables that will allow predictions to be made beyond the tables.

## **12.0 Integers**

The student will:

- 12.1 Represent integers on the number line.
- 12.2 Model situations with integers.
- 12.3 Compare integers using  $<$ ,  $=$ , and  $>$  symbols.
- 12.4 Develop strategies for adding, subtracting, multiplying, and dividing integers.
- 12.5 Use integers to solve problems.
- 12.6 Find inverses for given integers.
- 12.7 Sketch coordinate graphs in four quadrants.

## **13.0 Volume and Surface Area**

The student will:

- 13.1 Conceptualize volume as a measure of *filling* an object.
- 13.2 Conceptualize surface area as a measure of *wrapping* an object.
- 13.3 Find volumes and surface areas for rectangular prisms.
- 13.4 Find volume and surface areas for cylinders.
- 13.5 Reason about problems involving the surface areas and volumes of rectangular prisms, cylinders, cones, and spheres.

## **14.0 Linear Relationships**

The student will:

- 14.1 Represent the relationships among variables in a variety of ways, including the use of words, tables, graphs, and symbols.
- 14.2 Determine an appropriate range of values for independent and dependent variables.
- 14.3 Solve linear equations.
- 14.4 Find the slope of a line from a graph, a table, or an equation.
- 14.5 Find the y-intercept of a linear equation from its table, graph, or equation.
- 14.6 Write a linear equation given the slope and y-intercept.
- 14.7 Find a solution common to two linear equations by graphing or creating tables.

## **15.0 Probability and Expected Values**

The student will:

- 15.1 Review the understanding of experimental and theoretical probabilities and the relationships between them.
- 15.2 Make the distinction between single, specific outcomes and sets of outcomes that comprise an event.
- 15.3 Analyze situations involving independent events.
- 15.4 Analyze situations involving dependent events.
- 15.5 Use probability and equivalent fractions to find expected values.
- 15.6 Develop a variety of strategies for analyzing probabilities, such as using lists, counting trees, and area models.
- 15.7 Determine the expected value of a chance situation.

## **16.0 Number Sense**

The student will:

- 16.1 Read, write, and interpret the large numbers that occur in real-life measurements using standard, scientific and calculator notation.
- 16.2 Review the concepts of place value as it relates to reading, writing, and using large numbers.
- 16.3 Review and extend the use of exponents.
- 16.4 Choose sensible ways of comparing counts and measurements, including using differences, rates, and ratios.

## **17.0 Relations**

The student will:

- 17.1 Collect data and record in tables.
- 17.2 Construct coordinate graphs to represent data.
- 17.3 Make predictions from data tables or graphs.
- 17.4 Use patterns in data to find equations that model relationships between variables.
- 17.5 Distinguish between linear and nonlinear relationships.
- 17.6 Identify inverse relationships and describe their characteristics.
- 17.7 Use intuitive ideas about rates of change to sketch graphs for or to match graphs to given situations and to create situations that fit given graphs.

## **18.0 Real Numbers**

The student will:

- 18.1 Extend understanding of number systems to include irrational numbers.
- 18.2 Locate irrational numbers on the number line.
- 18.3 Represent decimals as fractions and fractions as decimals.
- 18.4 Use the Pythagorean Theorem to solve problems.
- 18.5 Use slope to solve problems.

## **19.0 Expressions and Equations**

The student will:

- 19.1 Evaluate expressions by applying the rules of order of operations.
- 19.2 Write symbolic sentences that communicate their reasoning.
- 19.3 Develop methods for manipulating symbolic expressions in ways that are both connected to and independent from tabular, graphical, and contextualized reasoning.
- 19.4 Make sense of symbolic expressions involving addition, subtraction, multiplication, division, and using exponents.
- 19.5 Recognize applications of the commutative and distributive properties.
- 19.6 Recognize and interpret equivalent expressions.
- 19.7 Explain the reasoning underlying the solution of linear equations.
- 19.8 Apply the properties for manipulating expressions to solve linear equations.

## 20.0 Transformations

The student will:

- 20.1 Recognize and describe symmetries of figures.
- 20.2 Use technology to examine symmetries and transformations.
- 20.3 Create figures with specified symmetries.
- 20.4 Perform transformations of figures, including reflections, translations, and rotations.
- 20.5 Give precise directions in mathematics for performing reflections, rotations, and translations.
- 20.6 Write coordinate rules for specifying the image of a general point under particular transformations.
- 20.7 Find single transformations that will produce the same result as a combination of transformations.
- 20.8 Use transformations to describe motions, patterns, and designs in the real world.